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Enterprise Systems Implementation Failure: The Role of Organizational Defensive Routines

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Abstract

This paper discusses some of the challenges that organizations face when implementing enterprise systems. A small-medium sized enterprise within a large conglomerate within the Asia-Pacific region was studied using critical ethnography. In this study it was found that organizational learning around strategically important issues failed to occur. This paper suggests the theory of organizational defensive routines for understanding how organizational learning may be hindered during the implementation of enterprise systems.

Keywords: Enterprise Systems Failure, ERP, Defensive Routines, Ethnography

1. Introduction

This paper discusses some of the challenges that organizations face when implementing enterprise systems. In particular, we focus on how organizational learning around strategically important issues may fail to occur. This paper contributes to the literature on the implementation of enterprise systems and to the literature on IS implementation failure more generally (Larsen et al. 1999; Myers 1994; Sauer 1999).

There were many political issues surrounding the development and implementation of the enterprise system. In this organization, enterprise integration was a corporate battle ground – it was the issue over which a political conflict between two camps was fought. Our analysis shows that the new ERP system was designed to support a future corporate world and work environment that never arrived. The strategic assumptions that had driven the dream of enterprise integration were no longer valid just a few years later. Issues that could have been debated productively were not because of the failure to overcome organizational defensive routines.

The organization was a small-to-medium sized enterprise within a large conglomerate within the Asia-Pacific region, called Stark (all names are pseudonyms in accordance with a confidentiality agreement). Stark was one of many subsidiaries within the Solteria group (one of the global 500 companies with annual revenues of more than US$4 billion). One of the authors studied Stark using critical ethnography.

The paper is organized as follows. In the next section we review the research literature on enterprise systems. In Section 3 we discuss our theoretical framework. Section 4 explains our research method. In Section 5 we present our data on the history of enterprise integration at Stark. Section 6 analyzes the data. The final section is the conclusion.

2. Literature Review

Defining Enterprise Systems

ERP systems, or "enterprise systems" for short, have been defined as "comprehensive, packaged software solutions [that] seek to integrate the complete range of a business' processes and functions in order to present a holistic view of the business from a single information and IT architecture" (Gable 1998). In practice, however, companies with multiple sites may have different ERP configurations (Bhattacherjee 2000; Markus et al. 2000a). The conglomerate we studied, for example, was a large, highly diversified international conglomerate. Its various subsidiaries had over a dozen different ERP systems from all the major vendors! In this kind of situation, the concept of one tightly integrated package for the entire enterprise is not feasible (although it may be feasible for individual companies within the conglomerate to have one ERP system).

A somewhat broader definition of ERP is offered by Shanks and Seddon (2000). Focusing more on the shared information and data flows that enable integration of enterprise-wide processes, they define ERP as: "comprehensive packaged software solutions that integrate organizational processes through shared information and data flows."

Enterprise Systems Implementation

Recent research has emphasized the importance of the social, cultural and organizational aspects in ERP implementation (e.g., Krumbholz et al. 2001; Larsen et al. 1999; Lee et al. 2003; Markus et al. 2000b; Soh et al. 2000). For example, Hanseth and Braa (1999) studied the ability of one organization to change after the ERP had been implemented. They found that the dream of standardization was like "hunting for the treasure at the end of the rainbow" (Hanseth et al. 1999, p. 121). Other IS researchers have focused specifically on the role of power and politics in ERP implementations (Allen et al. 2001; Koch 2001).

There are several ways enterprise systems may support, enable or constrain certain corporate strategic initiatives (Davenport 2000b; Markus et al. 2000b). For example, SAP assumes a translation from strategy to strategic objectives to key performance indicators to the key processes that are in turn supported by the SAP system (SAP 2001). This translation is assumed to be one way, from strategy to processes. In SAP's worldview, the relationship between strategy, critical success factors, general (key) performance indicators, measurable performance indicators, processes and sub-processes is central to the implementation of an enterprise system. This is illustrated in Figure 1.

In analyzing the relationship between strategy and business processes, SAP has been influenced by Porter's value chain (Porter et al. 1985). In Figure 2, for example, SAP promotes the benefits of an enterprise systems implementation by using Porter's value chain concept.

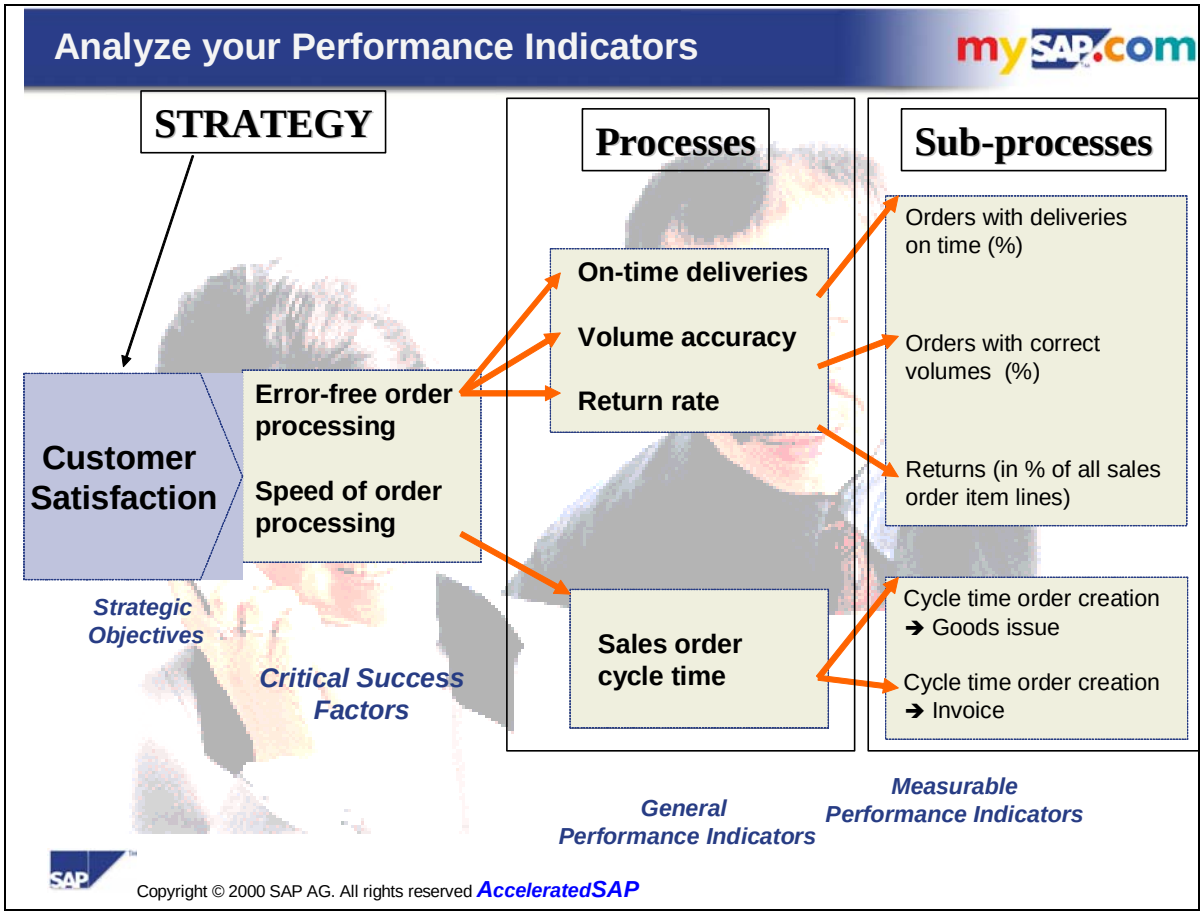

Figure 1 - Relationship between Strategy, Strategic Objectives, Critical Success Factors, General (Key) Performance Indicators and Measurable Performance Indicators (adapted from SAP, 2001)

Thus we can see that certain strategic paradigms have permeated the way enterprise systems are implemented. Enterprise systems are often seen as a means of implementing corporate strategy (e.g., Bhattacherjee 2000; Davenport 2000a; Markus et al. 2000b).

However, while some researchers have acknowledged that changes in strategy are to be expected in the longer term (Davenport 2000a; Larsen et al. 1999), few researchers in IS have looked at the power struggles that may take occur when a company's strategy and in particular its enterprise integration strategy is formed and changes. In the organization we studied, as the dominant actors, coalitions, and political agendas changed over time, so too did the company's enterprise integration strategy. Potentially, this throws into question the value of a one-way translation from strategy to processes that is assumed by some ERP vendors.

Our research shows that the company's enterprise integration strategy was a corporate battleground. Within the context of this corporate battleground, organizational defensive routines hindered the achievement of better understanding between parties to resolve strategically important issues. It is this failure to learn that is the focus of this paper.

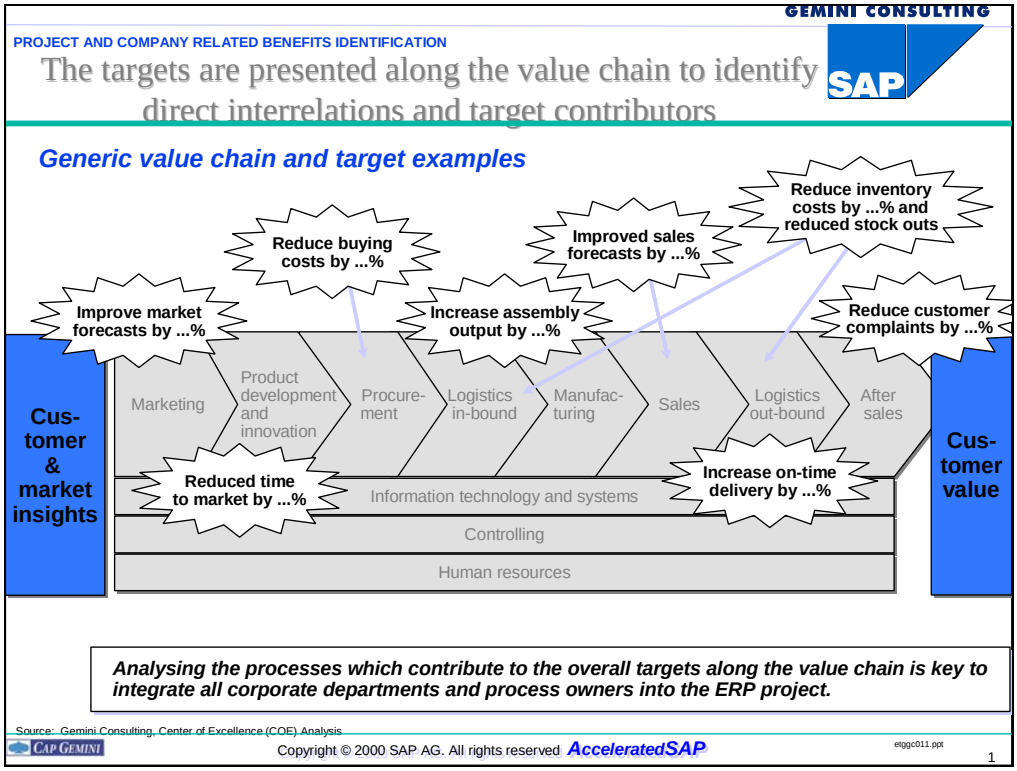

Figure 2 - SAP's and Cap Gemini Consulting's View of How Porter's Value Chain Relates to Benefits that Can Come from an ERP project (adapted from SAP 2001)

3. Theoretical Background

We decided to analyse the failure to learn during the implementation of this enterprise system using the theory of organizational defensive routines developed by Argyris and Schon (1978; 1996). The theory of defensive routines has been used in the organizational learning movement (Argyris et al. 1996; Kim 1993; Senge 1990), in general management (Senge 1990), and system dynamics (Sterman 2000). A few researchers have also used this theory in information systems (Henfridsson et al. 2000; Sallaway 1987).

Organizational defensive routines is based on the theory of action perspective (Argyris et al. 1978; Argyris et al. 1996). Argyris and Schon (1974; 1978) based this perspective in part on Bateson's (1972) four levels of learning. However, Argyris and Schon (1978) have adopted only three of the four levels of learning: single loop, double loop and deutero learning (learning to learn).

Within the theory of action perspective an organization has a theory of action that consists of norms, strategies and assumptions. For example, a sugar cane refinery would have strategies that provide the rationale for harvesting cane instead of buying it from an intermediary. It would also have norms for performance such as a 15 percent per annum growth rate. Also, there would be assumptions that harvesting and processing sugar cane in a particular manner will be the most cost-effective way to conduct business. (Note that the term "strategy" used within the theory of action perspective differs slightly from the other notions of corporate strategy (e.g., Porter 1996). We will clearly distinguish this by using the term "theory-of-action strategy").

Single loop learning occurs when correction is done to the process through changes in theory-of-action strategies and/or assumptions but the norms do not undergo change. Double loop learning, on the other hand, involves changes in norms as well as perhaps theory-of-action

strategies or assumptions whereas deutero learning involves learning how to learn. Put in another way, single loop learning does not involve a change in the master program (or the governing values mentioned below) that causes the organization to perpetuate errors but double loop learning does (Argyris 1993).

Organizational defensive routines are: "actions or policies that prevent individuals or segments of the organisation from experiencing embarrassment or threat. Simultaneously, they prevent people from identifying and getting rid of the causes of the potential embarrassment or threat. Organisational defensive routines are anti-learning, overprotective, and self-sealing" (Argyris 1990, p. 25). These defensive routines are rooted in what Argyris and Schon call the Model I type of human behaviour summarized in Table 1.

The four governing values in the left column of the table represent norms and interpretive schemas that underlie unproductive action strategies. As a result of these values, unintended consequences of action such as a manager being seen as defensive, inconsistent, or controlling occur. When this happens, it is difficult to enter into productive dialogue to question the underlying assumptions of a course of action. Eventually, this manager does not revise some faulty assumptions, leading to decreased long term effectiveness.

Argyris and Schon distinguish between Model I social virtues (counter-productive behaviours that inhibit double loop learning) and Model II social virtues (complementary behaviours that facilitate double loop learning). These two models are described in Table 2.

This model II theory-in-use is based on the governing values of "valid information", "informed choice" and "individual responsibility to monitor how well the choice is implemented." This individual responsibility includes monitoring how well one designs and implements his or her decisions in order to detect and correct errors. These governing values form the foundation for two action strategies:

- Advocate one's position and encourage inquiry or confirmation of it. This action strategy involves forthrightly expressing one's views while providing illustrations of fairly observable data, e.g., what was seen and heard. The reason for doing so is to invite examination and discussion of the reasoning process that has led to one's conclusion.
- Minimization of unilateral face-saving. Actions taken to save face, for yourself or someone else, are considered an act of mistrust of the other person's capacities. Such acts should be assessed.

These action strategies have been found to lead to productive reasoning where individuals make their premises and inferences explicit and clear (Argyris 1990).
The use of defensive routines as a lens helps us understand why actors may not be able to resolve contradictions inherent in organizational life.

The use of defensive routines does have its limitations. For example, the theory of defensive routines assumes that organizational members altruistically want to solve the problems they see around them. It does not cater for situations where actors purposely act to fulfil their hidden agendas at the expense of the organization.

Governing values	Action Strategies	Consequences for behavioural world	Consequences for learning	Effectiveness
Define goals and try to achieve them	Design and manage the environment unilaterally. (Be persuasive, appeal to larger goals, etc.)	Actor seen as defensive, inconsistent, incongruent, controlling, fearful of being vulnerable, withholding of feelings, overly concerned about self and others	Self-sealing	Decreased long term effectiveness
Maximize winning and minimize losing	Own and control the task. (Claim ownership of the task, be guardian of the definition and execution of the task.)	Defensive interpersonal and group relationship (dependence on actor, little helping of others).	Single-loop learning	
Minimize generating or expressing negative feelings	Unilaterally protect yourself. (Speak in inferred categories accompanied by little or no directly observable data, be blind to impact on others and to incongruity between rhetoric and behaviour, reduce incongruity by defensive actions such as blaming, stereotyping, suppressing feelings, intellectualizing etc.)	Defensive norms (mistrust, lack of risk-taking, conformity, external commitment, emphasis on diplomacy, power-centred competition and rivalry).	Little testing of theories publicly Much testing of theories privately	
Be rational	Unilaterally protect others from being hurt (withhold information, create rules to censor information and behaviour, hold private meetings).	Low freedom of choice, internal commitment and risk-taking.		

Table 1 - Model I Theory-in-Use (adapted from Argyris et al. 1978)

Model I Social Virtues	Model II Social Virtues
Help and Support	
Give approval and praise to others. Tell others what you believe will make them feel good about themselves. Reduce their feelings of hurt by telling them how much you care, and if possible, agree with them that the others acted improperly.	Increase the others' capacity to confront their own ideas, to create a window into their own mind, and to face their un-surfaced assumptions, biases, and fears by acting in these ways toward other people.
Respect for Others	
Defer to other people and do not confront their reasoning or actions.	Attribute to other people a high capacity for self-reflection and self-examination without becoming so upset that they lose their effectiveness and their sense of self-responsibility and choice. Keep testing this attribution opening.
Strength	
Advocate your position in order to win. Hold your own position in the face of advocacy. Feeling vulnerable is a sign of weakness.	Advocate your position and combine it with inquiry and self-reflection. Feeling vulnerable while encouraging inquiry is a sign of strength.
Honesty	
Tell other people no lies or tell others all you think and feel.	Encourage yourself and other people to say what they know yet fear to say. Minimize what would otherwise be subject to distortion and cover-up of the distortion.
Integrity	
Stick to your principles, values and beliefs.	Advocate your principles, values and beliefs in a way that invites inquiry into them and encourages other people to do the same.

Table 2 - Comparison between Model I and Model II Social Virtues (Argyris 1990), p. 106 - 107)

4. Research Method

As was mentioned earlier, one of the authors studied Stark – one of many subsidiaries within the Solteria group - using critical ethnography. Ethnographic research has emerged as one important method for studying the social and organizational contexts of IS development and use (Harvey et al. 1995; Myers 1999). Critical ethnography is one particular kind of ethnographic research (Myers 1997).

The data was obtained over a six-year period in total, from 1996-2001, with the most intensive period of fieldwork being from August 1999 to August 2000. Data sources included interviews, informal chats, meetings, observation, the company's Intranet, and various documents such as e-mails, annual reports, and newspaper articles.
One hundred and five formal interviews were conducted (most of which were audio taped) with 69 people. Many informal discussions with employees also took place. As well as interviews, meetings were attended at various levels and departments.

5. Enterprise Integration at Stark

Stark is a small-to-medium sized enterprise within a large conglomerate within the Asia-Pacific region (called Solteria). Solteria was one of the global 500 companies with annual revenues of more than US$4 billion. The organisation structure of the Solteria empire for the year 2000 is shown in the next figure.

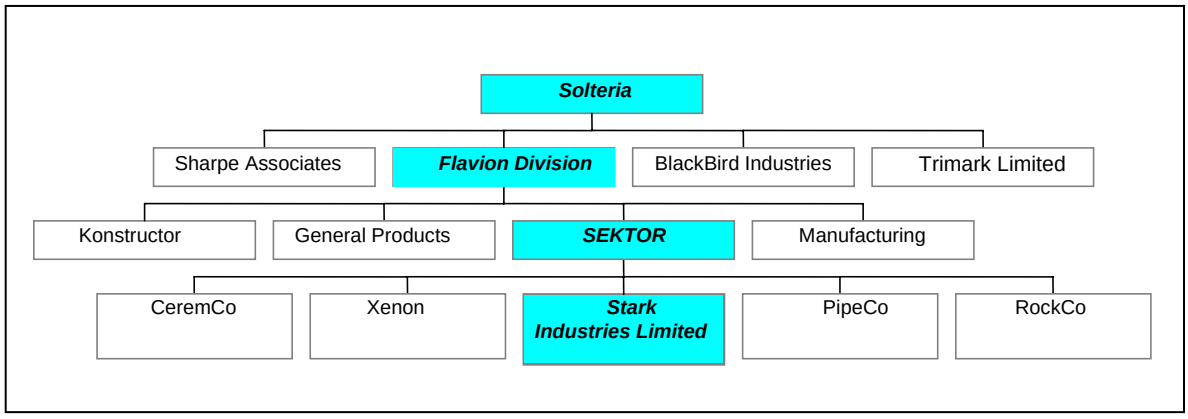

Figure 3 - Organizational Structure of Solteria Limited (2000)

Stark employs around 700 people and is now comprised of five businesses: CamCo, MaxCo, HinoCo, DrinCo and ModCo. Prior to November 1999, Xenon was also part of Stark.

1993 - A Change of Strategy

In February 1993 David Callon assumed the role of general manager of Stark. Prior to his arrival, the three business units — MaxCo, Xenon and CamCo — were merged to form a new entity: Stark Industries Limited. An enterprise integration movement now began at Stark.
Stark was restructured along regional lines to achieve greater market awareness and customer focus (this was in contrast to the previous emphasis on production). With the reorganization also came the consolidation of administrative centres.

Under David Callon there was a change of strategy for the company. It was decided that Stark would not longer focus on production, but would become the marketing arm of the SEKTOR Group of companies. Stark would focus on the creation of new markets, the

transformation of its product-oriented mindset and culture to one of providing customers with end-user system solutions, and differentiation through better service. Stark believed that it had to transform itself from a traditional product-focused business to a service-oriented business.

After this strategic review, Stark undertook many projects with the aim of developing a new corporate identity, developing new corporate capabilities, and changing the organization. One of these was a Strategic Information Technology Project (SITP).

1995 - The ERP Project

The Strategic Information Technology Project was undertaken from June 1994 to May 1995 and was assisted by a large global consulting company (herein called BigFive Consulting). Stark recognized that the information systems of Stark needed to be linked to its strategic business plan.

The primary objective of the SITP was "to achieve greater integrity, reliability, timeliness and usefulness of information available to Stark management." The SITP team with the help of BigFive Consulting recommended that "Stark seek an integrated packaged software product to support all if not most of the business functions." The new system was expected to support a new re-engineered process, namely, the centralized order acceptance and delivery process for Stark. This would involve a new centralized order acceptance and delivery centre that would centralize order acceptance and delivery across MaxCo, CamCo and Xenon. After a long software search period, Stark selected DAREA (a pseudonym for one of the top five ERP vendors in the world).

The new system was chosen to support a corporate culture and work environment that was yet to be created. This new corporate world would involve the consolidation not only of plants within CamCo (that were currently competing against each other) but also of the three main businesses of Stark. These sister businesses did not get along well with each other.
Traditionally, most of the companies within the Solteria empire were fairly autonomous. The Solteria conglomerate as a whole had a cultural norm of commensurate authority, responsibility and accountability at the business unit level.

However, this cultural norm was now diametrically opposed to what was proposed with the new ERP system. The new system would require a certain degree of cooperation and process standardization.

Old-timers versus New-timers

At the highest level of Stark, there were two groups: the New-timers and the Old-timers. The New-timers were comprised of the then general manager of Stark, David Callon, and several senior managers. The New-timers believed that new technology was needed to improve the business.

The Old-timers believed the business was as simple as it always had been. Therefore, these new initiatives served only to over-complicate the business. In their opinion, there were only a few fundamental things one needed to do to run the business well.

Wyatt Dunkins, the current leader of the Old-timers, had been with the Stark since the early 1980s and had been part of the team that expanded the business. He was considered one of the most powerful figures in Stark.

1997-1998: The Strategic Debates

Although Stark had yet to fully implement its new ERP system, there were debates at senior levels of Solteria and Flavion on the fundamental role that Stark would play within the Sector. Wyatt Dunkins, one of the Old-timers, lobbied for a change in Stark's strategic role and enterprise integration strategy with the CEOs of SEKTOR and Flavion. He argued that the three main businesses of Stark should be managed in a more separate manner. The end result of these debates was a decision to change Stark from a marketing arm of SEKTOR to that of production i.e. back to what it was before! In late 1998 Gene Romm succeeded David Callon as the new CEO of Stark.

> [The change of Stark's strategic role has] certainly taken place since I left [in December 1998]. But [it was] starting to take place a little bit over the implementation [of] Project Bridge. We're challenging, at senior levels in Solteria about what role Stark was to have inside the SEKTOR [group of companies] – whether it was about strategic growth or whether it was just an operating unit that was at the end of the value chain and we wanted to keep it tight and simple. (Interview with David Callon, General Manager of Stark from 1993 to 1998, 16 February 2001)

1999: New Leader, Different Vision

Gene Romm did not share the same integrated company vision as David Callon. Instead of a tightly integrated company, Gene Romm espoused a clearer separation between MaxCo, CamCo and the individual businesses of Stark. This stood in contrast to the previous CEOs view that Stark's businesses should be tightly coordinated. The previous enterprise integration strategy for Stark was starting to unravel.

2000: Post-Implementation

By the end of 1999, Stark had managed to roll-out DAREA throughout the whole country. However, Stark employees generally hated DAREA. Worse, most senior managers believed that DAREA had been a bad investment. The new CEO of the SEKTOR group thought that DAREA was inferior to another ERP product usually widely throughout the group.

In February 2000 the Stark ERP Support team considered various options to upgrade DAREA to a later version. However, given the latest business strategy for Stark, they decided to move towards splitting the "sales and distribution" tables shared by MaxCo and CamCo. In hindsight, they considered that these two businesses were too tightly integrated.

In summary, we can see that David Callon, appointed CEO in 1993, had a strategy of creating a tightly integrated, service-oriented company. DAREA was chosen and implemented to support that strategy. However, David Callon, along with his strategy, left in 1999. Of the twelve managers who signed off the ERP project at the start, only three were left by December 2000.

Now Stark had a new CEO and a new strategic vision. This strategic vision was diametrically opposed to David Callon's vision, but almost identical to what it had been before he came along. This meant that DAREA was designed for a world that would never exist.

> "It didn't take a 180 degree turn but it, sort of, we were quite expansionist and visionary and we came back to a very conservative operational [focus] and … so it wasn't a dramatic change but it was more a degree of how expansionist we would

have been had we wound the dial back a little bit to be more conservative. But that – that did have an implication on [the] DAREA [project] and would we have chosen DAREA or a similar ERP system if we had the more conservative vision? **Probably not**." (Interview with David Callon, initiator of the ERP project when he was the General Manager of Stark from 1993 to 1998, 27 July 2000, emphasis added)

6. Analysis

In this section we will analyze our data using three themes: conflict of strategic paradigms, influence of dominant actors, and organizational defensive routines.

Conflict of Strategic Paradigms

At a deeper level, one can observe a conflict of strategic paradigms between two opposing camps: the New-timers and Old-timers. The New-timers believed that Stark should compete on the basis of service and on-time delivery, whereas the Old-timers believed that Stark should complete on the basis of social capital accumulation and maintenance. Nowhere was this more evident than at the centralized order acceptance and delivery centre.

The centre was the epitome of Stark's enterprise integration efforts. By the end of 1999 the strategies of the New-timers had been inscribed into the centre's processes and systems (c.f. Orlikowski 2000). However, the centre never achieved the results of the dream of integration.

This was because the centre was designed to ensure on-time predictable product delivery as a key differentiator for competitive advantage. However, from time to time, Wyatt Dunkins or the Auckland Sales Manager (of the Old-timers) would force a large order through the already congested product delivery schedule to please a big customer. This was because, in his view, Stark depended on good social capital accumulation and maintenance with large customers. These customers would call up on one day and make demands that their order be put ahead of others. Wyatt Dunkins did not want to lose these big customers (and he was prepared to disadvantage smaller customers and disrupt the delivery schedule if needed).

Just one year later, the reengineered centralized order acceptance and delivery centre was split. This put an end to the dream of "mission control" that was pursued by David Callon. The Old-timers had won.

The influence of dominant actors

After Stark was formed from its constituent businesses, the New-timers attempted to develop a single corporate identity and chose a new ERP system to support the vision of a more tightly integrated, service-oriented firm. However this vision, along with the new ERP system, was diametrically opposed to some entrenched social structures and the values of the Old-timers. The Old-timers opposed the integration effort.

But by the time Stark's strategic role was changed back to being a production arm of the sector, DAREA had already been inscribed with the intentions of the New-timers. DAREA was like a freight train that was almost impossible to stop.

Organizational Defensive Routines

We suggest that overcoming organizational defensive routines may be important in information technology enabled enterprise integration projects. Strategic debates on important, conflicting and sensitive issues are often implicated in enterprise integration

efforts. We suggest that resolution of these debates is crucial for a company's strategic objectives and competitive strategies to be realized in an enterprise system.

Due to space constraints, we will focus on just one issue: the unresolved conflict between the strategies of the New-timers and Old-timers. The New-timers advocated competing via predictable on-time delivery, whereas the Old-timers advocated competing via accumulation and preservation of social capital. While one might argue that the pursuit of both strategies was not mutually exclusive, in Stark they were debated as such. This unresolved debate can be understood by drawing on the concepts of single loop learning, double loop learning and defensive routines (Argyris 1990; Argyris et al. 1978; Argyris et al. 1996).

The next figure summarizes the two competing strategies as single loop learning systems that were never effectively resolved by undertaking double loop learning. Double loop learning could have helped Stark effectively address apparent but not fundamental contradictions between the two strategies. The unresolved strategic debate trickled down to the design and operations of the centralized order acceptance and delivery centre.

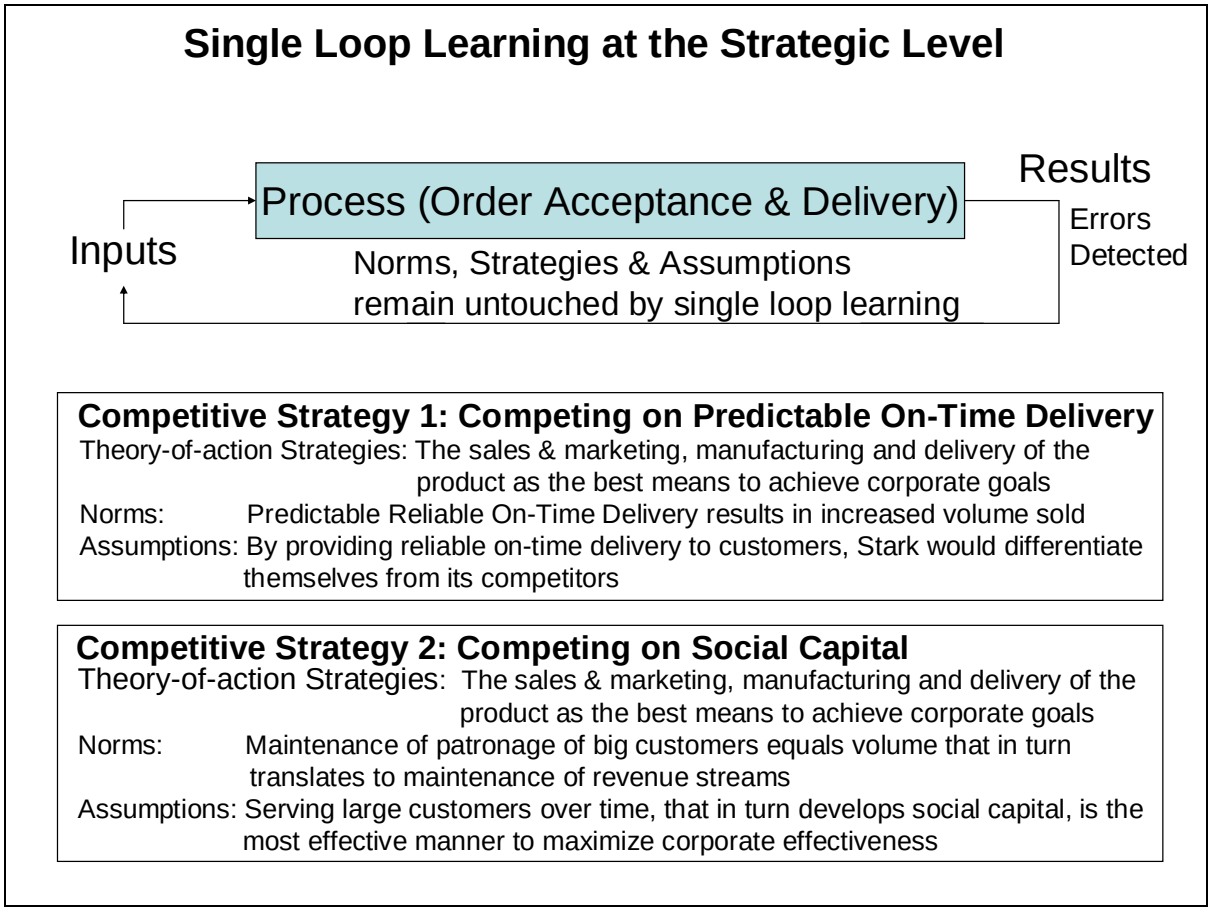

Figure 4 - Single Loop Learning at Stark that Results in Unresolved Competing Strategies

In the figure above, both competitive strategies were concerned with the sales, marketing, manufacturing and delivery of the product to customers. However, the norms and assumptions of these two competitive strategies differed. With competitive strategy 1, the results of the order and delivery process are judged on whether on-time delivery has been achieved. This is based on the expectation that predictable reliable on-time delivery over time results in increased sales volume. With competitive strategy 2, the results of the order and delivery process are judged on whether Stark maintained or enhanced its social capital with

its big customers. The basic rationale of this strategy is that maintenance of social capital will eventually result in guaranteed future sales. With regard to the differences between the assumptions of the two competitive strategies, both appear diametrically opposed.

It appears to us that both camps (the New Timers and the Old Timers) failed to resolve these conflicting strategies productively. The result was the non-achievement of the on-time delivery strategy and widespread dissatisfaction with the ERP system.

It is widely recognized that the linkages between strategy, strategic objectives, key performance indicators and the capability accorded by the enterprise system are crucial in the realization of benefits in enterprise systems investments (Davenport 2000a; SAP 2001)). However, as the discussion above shows, unresolved strategic debates (cf. Argyris et al. 1996) may also lead to a waste of effort in integrating the enterprise. We suggest the lack of resolution of these debates may be due to organizational defensive routines that prevent mutual learning taking place.

7. Conclusion

In this paper we have discussed the implementation of an enterprise system in a small-medium sized organization within a large conglomerate within the Asia-Pacific region. We have seen that enterprise integration at Stark was a corporate battleground. Unfortunately, a strategically important debate within Stark was not resolved before the viewpoint of one party (the New-timers) was inscribed into Stark's enterprise system. We have suggested that the resolution of this debate was hindered by organizational defensive routines. In our view, organizational defensive routines hindered the achievement of better understanding between parties to resolve strategically important issues. By the time the system went live, the company's enterprise integration strategy had already changed. The end result was a new ERP system designed to support a future corporate world and work environment that never arrived. Given the prevalence of defensive routines and political power plays in organizational life (Argyris 1992; Argyris 1993; Argyris 1999), we believe our findings may be applicable across a wide range of organisations. Further research is needed to find out if failure to learn is a common feature of enterprise systems implementation efforts.

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